Results on the Study of Seven Families of R. Coleoptera of Freshwater in Middle Albania

Ecosystem

Keywords: water beetles, sheathed wing, micro invertebrates, crenon, ritron, vegetation of water etc.

Jakov Oga | **Department of Biology - University "A. Xhuvani", Elbasan.**

Abstract

In this study are given the results of the ecosystematic study of sheathed wing of 7 families. The study area is the central of Albania, from Pogradec region to Divjake and Vlora region. From the authors are given 43 new species for Albania. Study is accompanied with considerations for vegetation in areas where were conducted expeditions and ecological considerations.

Scope of the Study

Given the fact that the sheathed wings play an important role in food chains in aquatic ecosystems and seeing the few works done for this group in Albania, we undertook an extensive study about them.

Materials and Methods

As study area was defined the Pogradec region, Shkumbin River with its affluents, Belshi's lakes, Librazhdi region and ongoing the Elbasan region, area of Peqin - Rrogozhine, rezervoirs of Divjaka and the area of Drashovica – Kanine.

Expeditions were conducted within 10 years. Those were carried out at different hours of the day. Samples were taken with three types of hydro-biological netting and we were looking under the stones of shore and between plants. The result is given also by mowing of grass in the water without seeing what will be captured. *The environments used for collected materials includes rivers, streams, lakes, ponds, swamps and wetlands.*

Streams and small rivers where we have accumulated materials are located in areas of Shkumbin crenon (Çezme and Bishnica Pogradec Gjinar etc.) and more in metaritron areas etc.

Conservation Techniques

For most adults of sheathed wing with small body and larvae, the best conservator environment is alcohol 75^{o}. Preliminarily those are placed for awhile in hot water up to 80-90^{o}. For large adults (Dytiscidae, Hydrophillidae) further collection is done in the dry. Individuals are permeated with needle or stick to thin papers. In such way we can save the defining traits. For determination of sheathed wing adults often we prepared preparations of petrified parts of the genitalia with standard methods. To analyze the similarity of species of insects of the order Coleoptera we applied Jaccard formula based on Peja, Paparisto etc.

For the studied groups, the constant is a very important indicator because the habitat and water indicators are very diverse. In such way it shows the ecological valency of the specie.

The calculation was made according to Peja with formula K= $\frac{a}{p}$ x 100.

Records were kept and considerations were gave to the biology and ecology of the genders studied. During the study and definitions, were made about 270 original pictures of the appearance, wings etc.

Results

To be familiar with the publications taken for water insects of the families of R.Coloeoptera included in this study, we have the following researchs for Albania and the studied region:

-Viktor Apfelbeck who published in 1904 – Die Kaferfauna der Balkanhalbinsel, Berlin, gives information about some species also for Albania. Since we have no assurance what he calls Albania territory at that time, we can not take them for granted species of our country. We say this because we start from Francescoli when he mentions our country as areal for spreading of 26 species according to Apfelbeck 1904.

- Erno Csiki published in 1940 – Explorationes zoologicae ab E. Csiki in Albania peractae, where (for the present borders of Albania) for Hydrophilidae family (where he introduced the family Helophoridae) gives nine species; for Dytiscidae family gives two species; for Gyrinidae family gives one specie, for fam. Dryopidae gives one specie.

- Xhelo Murraj give two species for fam. *Dytiscidae*. Anila Paparisto for water sheathed wing gives nine species. Dhimitër Dhora givs three species for lake sheathed wing. Arjana Laçej for water sheathed wing gives two species.

Vegetation

Since there are many species that have as habitat waters with rich vegetation or using vegetation for food, during conducted expeditions are evaluated the diversity of aquatic plants and phytocenoses. This is the reason that we distinguish separately this matter.

The vegetation of the area of forests and Mediterranean shrublands (Thermal water, Valley of Shkumbin, Byshek, Mirake, Pogradec etc.) consist of wood species like the gender *Quercus*,(*Q. coccifera* – Kaninë*) Pinus, Platanus orientalis, Alnus, Tamarix parviflora, Populus, Salix, Olea europaea, Ulmus, Pistacia* etj.

Shrubs are represented by *Erica arborea, Arbutus unedo, Myrtus communis, Vitex agnus-castus, Phillyrea latifolia, Olea oleaster, Rubus ulmifolius, Spartium junceum, Paliurus aculeatus, Crataegus monogyna, Rosa canina* etc.

In the area of oak and beech (Gjinar, Pogradec - Kabashi brook, stream of Pevelan-Dunicë, Çërrava river etc.), the tree species *Quercus robur, Q. cerris, Fagus sylvatica, Castanea sativa, Pinus nigra* etc., create a variegated plant physiognomy accompanied by species of the genus Acer, *Sorbus, Tilia* etc. As sub forest level elements can mention bush *Carpinus orientalis, Ostrya carpinifolia, Buxus sempervirens, Juniperus oxycedrus, Rosa canina, Malus sylvestris* etc.

The vegetation of hydro-hygrophilous plays an important role in aquatic ecosystems. It directly or indirectly provides food and shelter for a large number of organisms such as insects, fish, birds, etc.. The vegetation of hydro-hygrophilous is appreciated in micro-phytocenoses associations at water edge as rivers, streams, springs, streams, lakes, ponds, reservoirs, swamps, etc.. The vegetation in these associations are represented by herbaceous plants immersed and rooted, by the bushy and tree species and by type of algae *Chlorophyta, Bacillariophyta* etc..

From the hydro-hygrophilous vegetation of the Shkumbin valley can mention *Tamarix parviflora, Platanus orientalis, Alnus glutinosa,* gender *Salix, Populus, Phragmites australis, Typha latifolia, Equisetum palustre, Tussilago farfara* etc.

Hydro-hygrophilous vegetation species as *Alisma plantago-aquatica, Polygonum persicaria, P. hidropiper, Nasturtium officinale, Veronica anagallis-aquatica, Eupatoria cannabinum* etc., meet in thermal aquatic environments in Elbasan.

In the black pine forests (Pinus nigra) of Gjinari, near water sources and countries, meet hydro-hygrophilous species as *Rumex alpinus, Caltha palustris, Ranunculus aquatilis, R. trichophyllus, Carex sp., Tussilago farfara, Pinguicula hirtiflora,* gjinia *Salix, Alnus* etc.

The vegetation in lakes of Dumre are represented by plants within 1-7 m water depth, plants in shallow moist places or backwater and plants to the edge of lakes on turf land. Plant communities with greater spreading are: *Nupharetum*, communities with white leather (*Nymphaea alba* L.) and yellow leather (*Nuphar lutea*); *Myriophylletum*, communities with species of *Myriophyllum* (*Myriophyllum verticillatum*, *Myriophyllum spicatum*); *Characetum*, communities are also green algaes; *Ceratophylletum*, communities dominated by *Ceratophyllum* (*Ceratophyllum demersum*, *Ceratophyllum submersum*); *Lemnetum*, small communities of *Lemna gibba* and *Lemna minor species*. Vegetation communities in shallow and moist places or swampy are: *Phragmitetum*, dominated by reeds (*Phragmites communis*); *Typhetum*, reeds communities (*Typha angustifolia*), (*Typha latifolia*); *Scirpetum*, mixed communities especially with species of gender *Scirpus* as (*S. palustris, S. lacustris*); *Heterophylletum*, where we meet water plantain (*Alisma plantago-aquatica*), buttercup species (*Ranunculus* sp.) etc.

Systematic Results

Relying on [3,5, 6, 8, 22, 32,] of R/ *Coleoptera* (water sheathed wing families taken in review) number of species, after our presentation, from 45 becomes 88. ***So in our thesis we give 43 new species for Albania.*** The largest number of species discovered for the first time for our country belongs to the Fam. Dytiscidae with 19 species and FAM. Hydrophilidae with 15 species. Taking into consideration the work of Apfelbeck, Csikit, Murraj, Paparistos, Laçej and Dhorës the Fam. ***Dytiscidae,*** from 27 species, after our presentation **enriched** Albania with 46 species, **a growth that nearly doubles the number of species.** While based on Csiki, Paparisto and Dhora Fam. ***Hydrophilidae,*** from 6 species, after our presentation **enriched** into 21 species**.** Csiki on Fam. *Hydrophilidae also* calculates 4 species of Fam. *Helophoridae*. We have considered the latter as the special family and from 4 species, after our presentation, their number becomes 6. From the analysis of taxonomic data of our study comes out that in the studied region are represented:

For R/ *Coleoptera*: 7 families, 22 genders and 56 species: Fam: *Gyrinidae* with 2 species; Fam: *Haliplidae* with 5 species; Fam. *Noteridae* with 2 species; Fam: *Dytiscidae* with 28 species; Fam: *Hydrophilidae* with 15 species; Fam: *Helophoridae* with 3 species; Fam. *Dryopidae* with 1 specie.

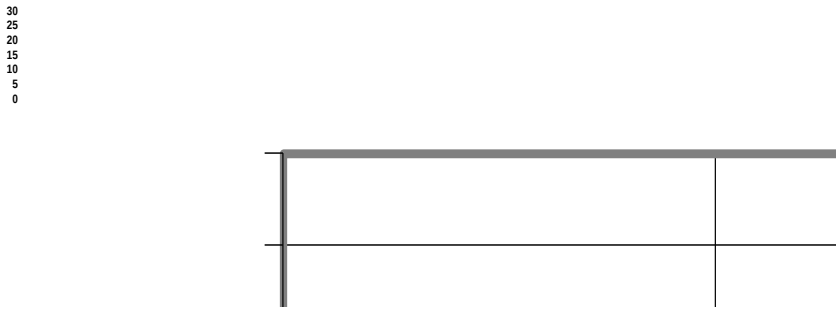

Chart 1Number of species for Fam. R / Coleoptera reported by other authors

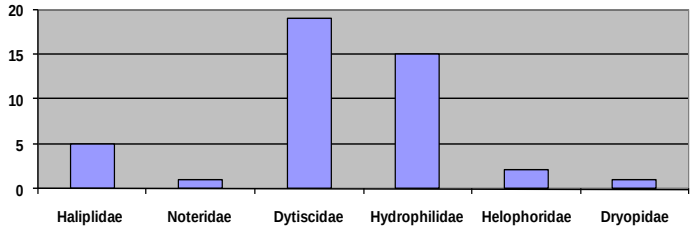

Chart 2 The number of species who are referred for the first time in Albania for families in the study of R / Coleoptera

List of species found by the authors of the study

1. *Peltodytes rotundatus* Aube, 1836 *	30. *Ilybius obscurus* Marsham, 1802 *
2.*Peltodytes caesus* Duftschimd, 1805 *	31. *Ilybius fuliginosus* Fabricius, 1792 *
3.*Haliplus lineaticollis* Marsham, 1802 *	32. *Rhantus pulverosus* Stephens, 1828*
4.*Haliplus laminatus* Schaller, 1786 *	33. *Hydaticus seminiger* De Geer, 1774 *
5.*Haliplus flavicollis* Sturm, 1834 *	34. *Hydaticus leander* Rossi, 1790 *
6.*Gyrinus marinus* Gyllenhall, 1808	35. *Graphoderes cinereus*, Linnaeus, 1758 *
7.*Gyrinus dejeani* Brylle, 1832	36. *Eretes sticticus* Linnaeus, 1767 *
8.*Noterus clavicornis* De Geer, 1774	37. *Dytiscus marginalis* Linnaeus, 1758
9.*Noterus crassicornis* Muller, 1776 *	38. *Coelostoma orbicularis* Fabricius, 1775 *
10.*Hyphydrus ovatus* Linnaeus, 1761	39. *Hydrochara caraboides*, Linnaeus, 1758 *
11.*Hydroglyphus pusillus* Fabricius, 1777 *	40. *Hydrobius fuscipes* Linnaeus, 1758 *
12.*Coelambus impressopunctatus* Schaller, 1783 *	41. *Helochares obscurus* Muller, 1776 *
13.*Hydroporus pubescens* Gyllenhall, 1808 *	42.*Anacaena limbata* Fabricius, 1792 *
14.*Hydroporus planus* Fabricius, 1781	43. *Laccobius striatulus* Fabricius, 1801 *
15.*Hydroporus ionicus* Fabricius, 1781	44. *Laccobius bipunctatus* Fabricius, 1775 *
16.*Hydroporus palustris* Linnaeus, 1761 *	45. *Laccobius gracilis* Motschulsky, 1855 *
17.*Scarodytes halensis* Fabricius, 1787	46. *Laccobius albipes* Kuvvert, 1890 *
18.*Deronectes moestrus* Fairm., 1858 *	47. *Enochrus bicolor* Fabricius, 1792 *
19.*Nebrioporus luctuosus* Aube, 1836 *	48. *Enochrus testaceus* Fabricius, 1801 *
20.*Nebrioporus suavis* Sharp, 1882 *	49. *Enochrus melanocephalus* Olivier, 1792 *
21.*Laccophilus hyalinus* De Geer, 1774 *	50. *Berosus luridus* Linnaeus, 1761 *
22.*Laccophilus variegatus* Germar, 1812	51. *Cymbiodyta marginella* Fabricius, 1792 *
23.*Copelatus haemorroidalis* Fabricius, 1787 *	52. *Limnoxenus niger* Zschach, 1788 *
24.*Agabus didymus* Olivier, 1795 *	53. *Helophorus liguricus* Angus, 1970 *
25.*Agabus biguttatus* Olivier, 1795 *	54. *Helophorus micans* Falderman, 1853 *
26.*Agabus nitidus* Fabricius, 1801 *	55. *Helophorus nubilis* Fabricius, 1776
27.*Agabus bipustulatus* Linnaeus, 1767	56. *Dryops luridus* Erichson, 1847 *
28.*Agabus nebulosus* Forster, 1771	Note: Species with footnote* are given for the first time for Albania by authors
29.*Agabus conspersus* Marsham, 1802	

Discussions

* Families that have the largest number of species in our study are Fam. *Dytiscidae* with 28 species and Fam. *Hydrophilidae* with 15 species

* The balance of species in Albania has changed positively. For the sheathed wing order all families in the study increased their number

* The number of new species for Albania is 43 for sheathed wing.

* Families increased significantly with new species are: Fam *Ditiscidae* increased with 19 species, Fam. *Hydrophilidae* with 15 new species, Fam. *Helophoridae* with 2 new species.

* First refer for fam *Haliplidae* 5 species.

* Among the sheathed wing the highest constant have species *Agabus biguttatus, Laccophilus hialinus, Helochares obscurus* and *Agabus bipustulatus* respectively with 15.21%, 14.3% and 13.04%.

* The most richer sub area in species for **sheathed wing** results sub area II with 34 species, then comes sub area 1 with 26 and less has sub area III with 25 species.

* The compositional of species similarity between areas are:

$K_{nzI\text{-}nzII} = 30.4\ \%$

$K_{nzI\text{-}nzIII} = 27.5\ \%$

$K_{nzII\text{-}nzIII} = 34.09\ \%$

More similarities has sub area II with sub area III.

* In the biological and ecological study results with the most variations and deviation genres: *Deronectes, Dryops, Helophorus, Noterus, Berosus.*

* Turns out that in our study area for **aquatic sheathed wing**, predominates species with center formation in Euro-Mediterranean and around him with 17 species (30.3%); Eurasian + Center eurasian with 11 species.

* Given the large number (percentage) of species reported for the first time in Albania, we assume that in our country exists many types unreported also for families presented by us and especially from those that are not presented either by foreign or national authors.

* In future we will also provide studies for families that have representatives in the plants near the water, on the wet banks such as families *Chrysomelidae*, *Staphylinidae*, *Curculionidae* and many others.

* The study of larvae is almost untouched by authors who have presented so far and also by us. Therefore it is a wide field for future study.

References

1. Berlov Eduard 2002: *Atlas pllavuncov (Dytiscidae) Rossii.*
2. Chynery M., 1997: *Insects*. Harper Collins Publishers. F. 93-100, 134-185.
3. Csiki Erno, 1940: *allattani kutatasai Aalbaniaban*. – Explorationes zoologicae ab E. Csiki in Albania peractae. Budapest.
4. Databanka Fauny Slovenska, 2002 *Coleoptera.*
5. Dhora Dh. 2005: *Liqeni i Shkodrës*. Shkodër.
6. Franciscolo E. M., 1979: *Fauna D'Italia- Coleoptera Haliplidae, Hygrobidae, Gyrinidae, Dytiscidaer*. Edizion Calderini Bologna.
7. Grup Autoresh, 1990: *Gjeografia fizike e Shqipërisë*. Tiranë.
8. Grup Autorësh, (1988-1996), *Flora e Shqipërisë*, vol.1-4. Tiranë.
9. Guignot F. 1947: *Faune de France.Coleopteres Hydrocanthares.* Paris
10. Helgard Reichholf-Riehm., 1984: *Insekten*. Mosoik Verlag, Munchen.
11. Kireicuk A.G. 2001: *Bionomija vodnih zhukov Rossii.*
12. Kirejcuk G. A., & Bramma H. B., 2001 : *Opredelitjel vodnih zhukov Rossii – Semejstvo Haliplidae.*

13. Kirejcuk G. A., & Shatrovski G. A., 2001: *Opredelitjel vodnih zhukov Rossii – Semejstvo Hydraenidae, Hydrochidae, Helophoridae*.
14. Kirejcuk G. A., & Shatrovski G. A., 2001: *Opredelitjel vodnih zhukov Rossii – Semejstvo Hydrophilidae*.
15. Kirejcuk G. A., 2001: *Opriedelitjel vodnih zhukov Rossii –Semejstvo Dytiscidae*.
16. Kirejcuk G. A., 2001: *Opriedelitjel semejstv vodnih zhukov Rossii.*
17. Laçej A. 2005: *Koleopterofauna e Malësisë së Madhe.* Tezë doktorature. Tiranë.
18. Lobanov A.L., 1999 : *vedenije na "Zhuki i koleopterologi"*.
19. Miho A. etj. 2005: *Gjendja mjedisore e disa lumenjve të ultësirës adriatike shqiptare*. Tiranë.
20. Miller, 1988: *Living in the environment*. Belmond California
21. Misja K., 1973: *Përcaktues insektesh*. Dispenca I, II. SHBLU, Tiranë.
22. Murraj Xh., 1968: *Disa rezultate mbi studimin e rendit të krahëfortëve (Coleoptera) të vendit tonë.* Buletini UT, Nr. 1.
23. Naqellari, P., etj., 2001, *"Të dhëna mbi vegjetacionin dhe florën e liqeneve të Dumresë".* Studime biologjike 5-6, fq 217-220. Tiranë.
24. Oga J., Thomollari Z. 2007 Studimi I flatraforteve dhe gjysemflatraforteve te ujerave te embla. Monografi: *Elbasan 2007*.
25. Olmi M., 1976: *Fauna D'Italia- Coleoptera Dryopidae- Elmidae* . Edizion Calderini Bologna.
26. Paparisto A., 2001: *Kontribut në njohjen e flatrafortëve të Ultësirës bregdetare shqiptare*. (Disertacion). Tiranë.
27. Polska Akadema Nauk., 1978: *Katalog Fauny Polsky –Coloeoptera*. Institut Zoologii. Cześć XXIII, tom 5, Warszawa.
28. Tachet H., Et All., 2000: *Invertebres D' Eau Douce*. Systèmatique, biologie, ècologie CNRS Èditions, Paris.
29. Thomollari Z., 2001: *Entomologjia*. Elbasan.
30. Thomollari Z., Oga J. 2004/1 *Lloje të reja për Shqipërinë të flatrafortëve tê ujit.* Buletini Shkencor UNIEL. Elbasan.
31. Thomollari Z., Oga J. 2005/2 Kumtimi i 19 *llojeve të reja për Shqipërinë nga studimi i familjeve Hydrophilidae, Helophoridae, Noteridae dhe Dryopidae.* Buletini Shkencor UNIEL. Elbasan.